AMENDMENTS TO THE CLAIMS:

1-18. (Canceled)

19. (Currently amended) A method for producing a gallium nitride group compound semiconductor by using an organometallic compound vapor phase epitaxy, comprising:

setting a mixing ratio of a silicon-containing gas to at least one other raw material gas during said vapor phase epitaxy at a desired value in a range over which a conductivity of the gallium nitride group compound semiconductor increases substantially proportionally with said mixing ratio so as to obtain a desired conductivity (1/resistivity) of said gallium nitride group compound semiconductor; ~~and~~

forming a first ~~said~~ gallium nitride group compound semiconductor layer by feeding said silicon-containing gas and said at least one other raw material gas at said mixing ratio; and

forming a second gallium nitride group compound semiconductor layer having a resistivity which is greater than a resistivity of said first gallium nitride group compound semiconductor layer, without feeding said silicon-containing gas.

20. (Currently amended) A method for producing a gallium nitride group compound semiconductor by using an organometallic compound vapor phase epitaxy, comprising:

setting a mixing ratio of a silicon-containing gas to at least one other raw material gas during said vapor phase epitaxy at a desired value in a range over which a carrier concentration of the gallium nitride group compound semiconductor increases substantially proportionally with said mixing ratio so as to obtain a desired carrier concentration of said gallium nitride group compound semiconductor; ~~and~~

forming a first ~~said~~ gallium nitride group compound semiconductor layer by feeding said silicon-containing gas and said at least one other raw material gas at said mixing ratio; and

forming a second gallium nitride group compound semiconductor layer having a resistivity which is greater than a resistivity of said first gallium nitride group compound semiconductor layer, without feeding said silicon-containing gas.

21. (Previously presented) A method for producing a gallium nitride group compound semiconductor according to claim 19, wherein said gallium nitride group compound semiconductor comprises $Al_xGa_{1-x}N$ ($0 \leq x \leq 1$).

22. (Previously presented) A method for producing a gallium nitride group compound semiconductor according to claim 20, wherein said gallium nitride group compound semiconductor comprises $Al_xGa_{1-x}N$ ($0 \leq x \leq 1$).

23. (Previously presented) A method for producing a gallium nitride group compound semiconductor according to claim 19, wherein said gallium nitride group compound semiconductor comprises GaN.

24. (Previously presented) A method for producing a gallium nitride group compound semiconductor according to claim 20, wherein said gallium nitride group compound semiconductor comprises GaN.

25. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 19, wherein said conductivity (1/resistivity) is not less than 3.3/Ωcm.

26. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 21, wherein said conductivity (1/resistivity) is not less than 3.3/Ωcm.

27. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 23, wherein said conductivity (1/resistivity) is not less than 3.3/Ωcm.

28. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 20, wherein said electron concentration is not less than $6 \times 10^{16}/cm^3$.

29. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 22, wherein said electron concentration is not less than $6 \times 10^{16}/cm^3$.

30. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 24, wherein said electron concentration is not less than $6 \times 10^{16}/cm^3$.

31. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 19, wherein said conductivity (1/resistivity) is ranging from $3.3/\Omega cm$ to $1.3 \times 10^2/\Omega cm$.

32. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 21, wherein said conductivity (1/resistivity) is ranging from $3.3/\Omega cm$ to $1.3 \times 10^2/\Omega cm$.

33. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 23, wherein said conductivity (1/resistivity) is ranging from $3.3/\Omega cm$ to $1.3 \times 10^2/\Omega cm$.

34. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 20, wherein said electron concentration is ranging from $6 \times 10^{16}/cm^3$ to $3 \times 10^{18}/cm^3$.

35. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 22, wherein said electron concentration is ranging from $6 \times 10^{16}/cm^3$ to $3 \times 10^{18}/cm^3$.

36. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 24, wherein said electron concentration is ranging from $6 \times 10^{16}/cm^3$ to $3 \times 10^{18}/cm^3$.

37. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 19, wherein said gallium nitride group compound semiconductor is formed on or above a buffer layer which is formed on a sapphire substrate.

38. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 20, wherein said gallium nitride group compound semiconductor is formed on or above a buffer layer which is formed on a sapphire substrate.

39. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 21, wherein said gallium nitride group compound semiconductor is formed on or above a buffer layer which is formed on a sapphire substrate.

40. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 22, wherein said gallium nitride group compound semiconductor is formed on or above a buffer layer which is formed on a sapphire substrate.

41. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 25, wherein said gallium nitride group compound semiconductor is formed on or above a buffer layer which is formed on a sapphire substrate.

42. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 28, wherein said gallium nitride group compound semiconductor is formed on or above a buffer layer which is formed on a sapphire substrate.

43. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 31, wherein said gallium nitride group compound semiconductor is formed on or above a buffer layer which is formed on a sapphire substrate.

44. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 34, wherein said gallium nitride group compound semiconductor is formed on or above a buffer layer which is formed on a sapphire substrate.

45. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 37, wherein said buffer layer is formed on said sapphire substrate by using

an organometallic compound vapor phase epitaxy at a growth temperature lower than that of said gallium nitride group compound semiconductor.

46. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 38, wherein said buffer layer is formed on said sapphire substrate by using an organometallic compound vapor phase epitaxy at a growth temperature lower than that of said gallium nitride group compound semiconductor.

47. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 39, wherein said buffer layer is formed on said sapphire substrate by using an organometallic compound vapor phase epitaxy at a growth temperature lower than that of said gallium nitride group compound semiconductor.

48. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 40, wherein said buffer layer is formed on said sapphire substrate by using an organometallic compound vapor phase epitaxy at a growth temperature lower than that of said gallium nitride group compound semiconductor.

49. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 41, wherein said buffer layer is formed on said sapphire substrate by using an organometallic compound vapor phase epitaxy at a growth temperature lower than that of said gallium nitride group compound semiconductor.

50. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 42, wherein said buffer layer is formed on said sapphire substrate by using an organometallic compound vapor phase epitaxy at a growth temperature lower than that of said gallium nitride group compound semiconductor.

51. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 43, wherein said buffer layer is formed on said sapphire substrate by using an organometallic compound vapor phase epitaxy at a growth temperature lower than that of

said gallium nitride group compound semiconductor.

52. (Original) A method for producing a gallium nitride group compound semiconductor according to claim 44, wherein said buffer layer is formed on said sapphire substrate by using an organometallic compound vapor phase epitaxy at a growth temperature lower than that of said gallium nitride group compound semiconductor.

53-118. (Canceled)

119. (Previously presented) A method for producing a gallium nitride group compound semiconductor according to claim 20, wherein said carrier concentration ranges from 1 x $10^{17}/cm^3$ to 1 x $10^{19}/cm^3$.

120. (Previously presented) A method for producing a gallium nitride group compound semiconductor according to claim 22, wherein said carrier concentration ranges from 1 x $10^{17}/cm^3$ to 1 x $10^{19}/cm^3$.

121. (Previously presented) A method for producing a gallium nitride group compound semiconductor according to claim 24, wherein said carrier concentration ranges from 1 x $10^{17}/cm^3$ to 1 x $10^{19}/cm^3$.

122. (Previously presented) A method for producing a gallium nitride group compound semiconductor according to claim 119, wherein said gallium nitride group compound semiconductor is formed on or above a buffer layer which is formed on a sapphire substrate.

123. (Previously presented) A method for producing a gallium nitride group compound semiconductor according to claim 120, wherein said gallium nitride group compound semiconductor is formed on or above a buffer layer which is formed on a sapphire substrate.

124. (Previously presented) A method for producing a gallium nitride group compound semiconductor according to claim 121, wherein said gallium nitride group compound semiconductor is formed on or above a buffer layer which is formed on a sapphire substrate.

125. (Previously presented) A method for producing a gallium nitride group compound semiconductor according to claim 122, wherein said buffer layer is formed on said sapphire substrate by using an organometallic compound vapor phase epitaxy at a growth temperature lower than that of said gallium nitride group compound semiconductor.

126. (Previously presented) A method for producing a gallium nitride group compound semiconductor according to claim 123, wherein said buffer layer is formed on said sapphire substrate by using an organometallic compound vapor phase epitaxy at a growth temperature lower than that of said gallium nitride group compound semiconductor.

127. (Previously presented) A method for producing a gallium nitride group compound semiconductor according to claim 124, wherein said buffer layer is formed on said sapphire substrate by using an organometallic compound vapor phase epitaxy at a growth temperature lower than that of said gallium nitride group compound semiconductor.

128. (New) A method for producing a gallium nitride group compound semiconductor according to claim 19, wherein said second gallium nitride group compound semiconductor layer is formed on said first gallium nitride group compound semiconductor layer.

129. (New) A method for producing a gallium nitride group compound semiconductor according to claim 19, further comprising:

after said forming said first gallium nitride group compound semiconductor layer and before said forming said second gallium nitride group compound semiconductor layer, stopping a flow of said silicon-containing gas.

130. (New) A method for producing a gallium nitride group compound semiconductor

according to claim 19, wherein said forming said first gallium nitride group compound semiconductor layer comprises controlling said resistivity of said first gallium nitride group compound semiconductor layer to be within a range from 3×10^{-1} Ωcm to 8×10^{-3} Ωcm.

131. (New) A method for producing a gallium nitride group compound semiconductor according to claim 130, wherein said resistivity of said first gallium nitride group compound semiconductor layer is controlled by varying a flow rate of said silicon-containing gas.